



**Connect Tech Inc.**  
*Embedded Computing Experts*

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# SSD/104 SATA

## User Manual



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## Limited Lifetime Warranty

Connect Tech Inc. provides a lifetime warranty for all of our products. Should this product, in Connect Tech Inc.'s opinion, fail to be in good working order during the warranty period, Connect Tech Inc. will, at its option, repair or replace this product at no charge, provided that the product has not been subjected to abuse, misuse, accident, disaster or non Connect Tech Inc. authorized modification or repair.

You may obtain warranty service by delivering this product to an authorized Connect Tech Inc. business partner or directly to Connect Tech Inc. along with proof of purchase. Product returned to Connect Tech Inc. must be pre-authorized by Connect Tech Inc. with an RMA (Return Material Authorization) number marked on the outside of the package and sent prepaid, insured and packaged for safe shipment. Connect Tech Inc. will return this product by prepaid ground shipment service.

The Connect Tech Inc. lifetime warranty is defined as the serviceable life of the product. This is defined as the period during which all components are available. Should the product prove to be irreparable, Connect Tech Inc. reserves the right to substitute an equivalent product if available or to retract lifetime warranty if no replacement is available.

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## Revision History

Revision	Date	Author(s)	Change(s)
0.00	02-10-2012	PD	Initial Manual Revision Created

## Customer Support Overview

If you experience difficulties after reading the manual and/or using the product, contact the Connect Tech Inc. reseller from which you purchased the product. In most cases the reseller can help you with product installation and difficulties.

In the event that the reseller is unable to resolve your problem, our highly qualified support staff can assist you. Our support section is available 24 hours a day, 7 days a week on our website at: [www.connecttech.com/sub/support/support.asp](http://www.connecttech.com/sub/support/support.asp). See the contact information section below for more information on how to contact us directly. Our technical support is always free.

## Contact Information

We offer three ways for you to contact us:

### Mail/Courier

You may contact us by letter at: Connect Tech Inc.  
Technical Support  
42 Arrow Road, Guelph, ON  
Canada N1K 1S6

### Email/Internet

You may contact us through the Internet. Our email and URL addresses on the Internet are:  
[sales@connecttech.com](mailto:sales@connecttech.com)  
[support@connecttech.com](mailto:support@connecttech.com)  
[www.connecttech.com](http://www.connecttech.com)

### Note:

Please go to the [Download Zone](#) or the [Knowledge Database](#) in the [Support Center](#) on the Connect Tech Inc. website for product manuals, installation guides, device driver software and technical tips. Submit your technical support questions to our customer support engineers via the [Support Center](#) on the Connect Tech Inc. website.

### Telephone/Facsimile

Technical Support representatives are ready to answer your call Monday through Friday, from 8:30 a.m. to 5:00 p.m. Eastern Standard Time. Our numbers for calls are:

Telephone: 800-426-8979 (North America only)  
Telephone: 519-836-1291 (Live assistance available 8:30 a.m. to 5:00 p.m. EST, Monday to Friday)  
Facsimile: 519-836-4878 (online 24 hours)

## Introduction

Connect Tech's SSD/104 SATA is a complete rugged stackable solid state drive (SSD) and storage solution that allows up to two mSATA SSD modules to be installed into any PC/104-*Plus*, PCI-104, PCI/104-Express and PCIe/104 stack or embedded system. SSD/104 SATA solid state drive (SSD) and storage solution improves performance, expands storage capacity and reduces overall storage footprint in an embedded system.

Designed with the latest generation of mSATA SSD modules, SSD/104 SATA solid state drive (SSD) and storage solution can be easily upgraded to accommodate future generations of mSATA modules for even greater system capacity and performance.

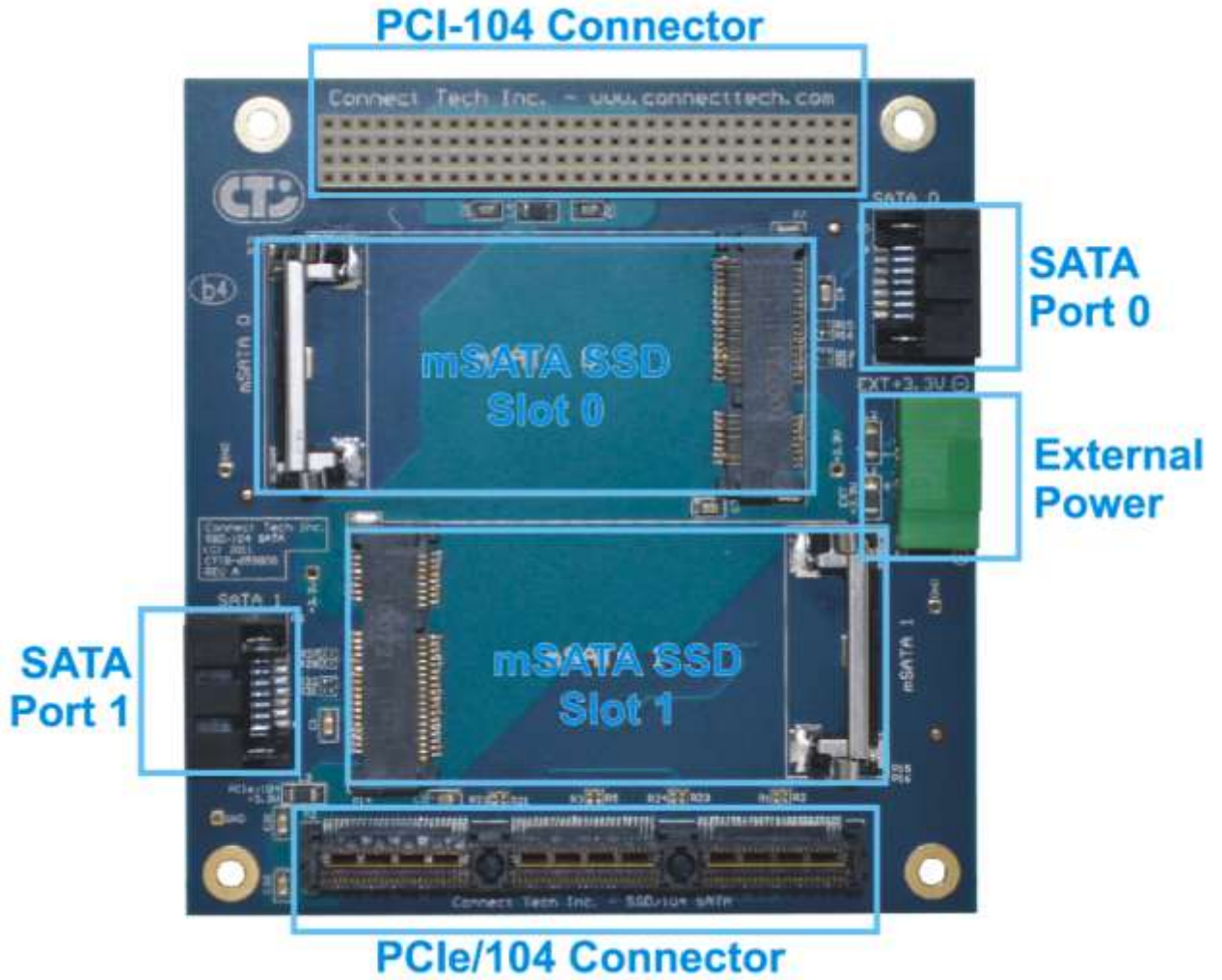
When combined with mSATA SSD modules, SSD/104 SATA solid state storage solution directly interfaces with the standard SATA bus, which can be used as a drop-in replacement for any SATA storage device. SSD/104 SATA can also be interfaced with any single board computer or embedded system using standard 7-pin SATA.

SSD/104 SATA is available as a complete storage solution with a preinstalled mSATA module, or as a separate mSATA carrier which supports any mSATA SSD module.

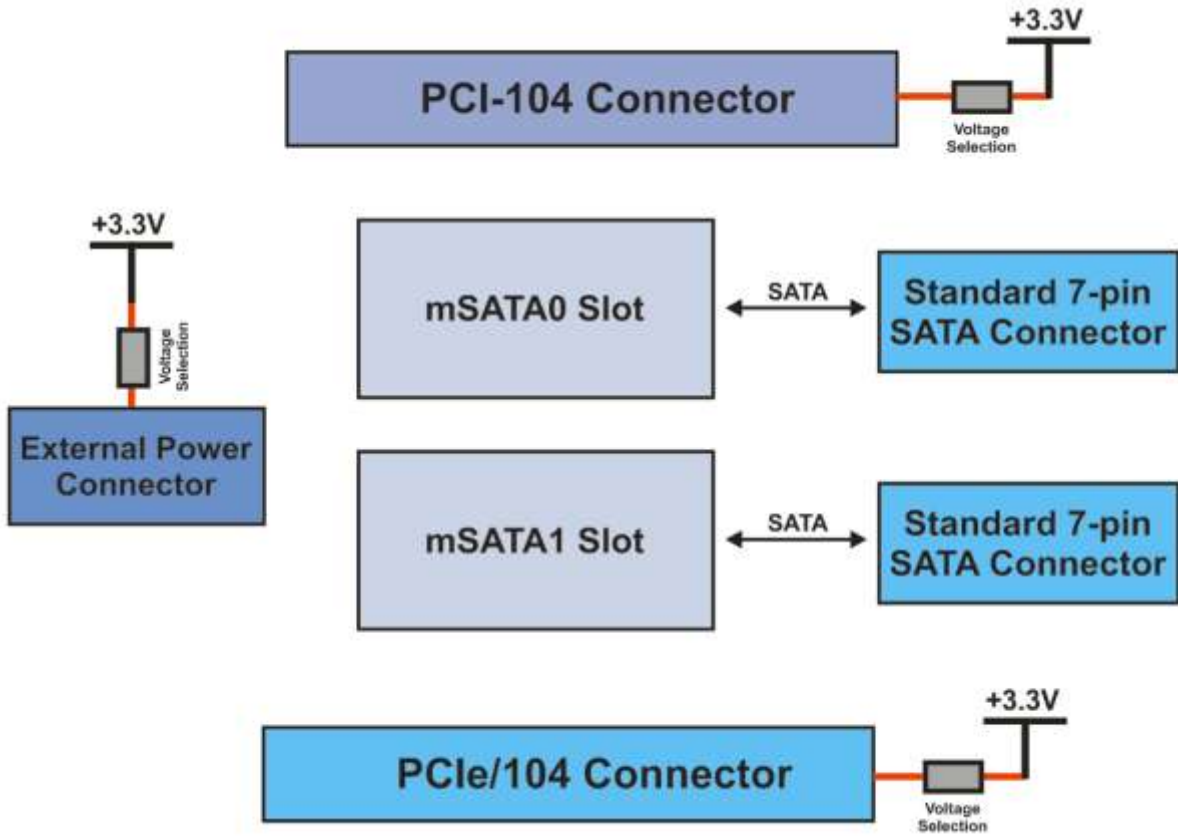
## Product Features

Specification	Details
<b>SSD Slots</b>	2 x mSATA SSD slots (JEDEC MO-300B compatible)
<b>Storage Capacities Options</b>	4GB, 8GB, 16GB, 32GB, 64GB, 128GB, 256GB (per mSATA slot) ** Or larger as new mSATA modules come to market
<b>Flash Type Options</b>	SLC or MLC
<b>Operating Temperature Options</b>	Industrial (-40 to +85) or Commercial (0 to +70)
<b>Power Requirement</b>	+3.3V / 0.5A max Which can be sourced by PCIe/104 Bus, PCI-104 Bus or External Connector
<b>Interface</b>	SATA Revision 2.6 SATA II 1.5Gbps / 3.0Gbps Will work with any SBC SATA port
<b>Performance</b> <i>Numbers may vary depending on mSATA module used</i>	Host Transfer Rate: 300MB/s Sequential Read: Up to 270MB/s Sequential Write: Up to 240MB/s Random Read IOPS: Up to 35k Random Write IOPS: Up to 30k
<b>SSD/104 Carrier Dimensions (Overall Board Size)</b>	3.550" x 3.775" (90.17mm x 95.89mm) PC/104 Compliant
<b>mSATA SSD Module Dimensions</b>	2.000" x 1.175" (50.80mm x 29.85mm) JEDEC 300-MB Compliant Mini PCIe Form Factor Compliant
<b>Power</b>	Supply Voltage: +3.3V ±5% Low Power Consumption: 260mA (Active) / 130 mA (Idle) Power is sourced directly from the PCIe/104 bus, PCI-104 bus or the external power connector
<b>Connectors</b>	Standard Right Angle 7-pin SATA data connectors mSATA Connectors PCI-104 stacking connector (optional) PCIe/104 stacking connectors (optional) 3.5mm pitch Phoenix Type power connector
<b>Build Options</b>	PCI/104-Express Build – Both PCIe/104 and PCI-104 stacking connectors installed PCIe/104 Build – Only the PCIe/104 stacking connector is installed PCI-104 Build – Only the PCI-104 stacking connector is installed No Bus Build – No stacking bus connectors installed
<b>Cable-Free Operation Option (PCIe/104 Type 2)</b>	The SSD/104 SATA also has the option to take the SATA signals directly from any PCIe/104 or PCI/104-Express Type 2 SBC, eliminating the need to use any SATA cables.
<b>mSATA SSD ports</b>	Up to 2 mSATA SSD modules can be installed

## Board Diagram



## Block Diagram





## Part Number Information

Part Number	Features
<b>SDG001</b>	<b>Full Build</b> – Both PCIe./104 and PCI-104 Connectors are installed
<b>SDG002</b>	<b>PCIe/104 Build</b> – Only PCIe/104 Connector is installed
<b>SDG003</b>	<b>PCI-104 Build</b> – Only PCI-104 Connector is installed
<b>SDG004</b>	No bus connectors installed, external power must be used.

To order any of these part numbers or to inquire about the other available ordering options please contact [sales@connecttech.com](mailto:sales@connecttech.com) for further information.

## Power Sourcing Explanation

The SSD/104 SATA board powers its mSATA modules from +3.3V. This voltage rail can be provided from the PCI-104 bus +3.3V rail, the PCIe/104 bus +3.3V rail or from the external +3.3V power connector on the board. It is important to check whether your SBC or SBC's power supply provides +3.3V over the embedded buses, if the SBC does NOT provide +3.3V power over the bus connectors the external power connector MUST be used.

The SSD/104 SATA board also has Ferrite Beads located near each power source that can be populated or de-populated to select the sourcing from a particular voltage rail, in most cases the default configuration of all installed will be adequate. These ferrites have the following designators L2, L3, and L4.

## Hardware Installation Information

Please follow these steps with installing the SSD/104 SATA into your system.

- 1) Ensure your SBC is powered OFF
- 2) Install the SSD/104 SATA card onto your PC/104 stack (if available)
- 3) Install mSATA modules into mSATA slots on carrier
- 4) Connect SATA cables from SSD/104 Carrier to SBC
- 5) Power ON your SBC

## mSATA SSD Module Information

Connect Tech's SSD/104 SATA Carrier board allows for the installation of 2 mSATA SSD Modules. mSATA modules should be JEDEC MO-300B compatible pinout and size. mSATA SSD modules are not only small in size and rugged but extremely and can drastically reduce boot time.

Both SLC and MLC flash types can be used as well as commercial and industrial operating temperature grades.

mSATA is a relatively new format for ultra-small Solid-State Disks (SSDs), developed by Intel. mSATA SSDs take a form factor similar to mini-PCI Express cards, and is now adopted by many manufactures, see below for a current listing of popular vendors with mSATA SSD modules available.

### Listing of mSATA SSD Module Vendors

ADATA  
AMP Inc.  
Apacer  
Delkin  
Delkin  
innodisk  
Intel  
Kingston  
NetList  
OCZ  
Renice  
RunCore  
Samsung  
Super Talent  
Swissbit



## Using SATA Port from the PCIe/104 Type 2 Bus

The SSD/104 SATA board has the ability to source its SATA channels directly from the PCIe/104 Type Bus. This can be done via 0 ohm 0402 sized resistor population options on the PCB and allows users to select from the TOP or BOTTOM side signals from the PCIe/104 bus. If you would like to order an SSD/104 SATA product from Connect Tech pre-configured to use PCIe/104 Type 2, please contact [support@connecttech.com](mailto:support@connecttech.com). Otherwise the follow procedures can be performed by the end-user at their own risk.

**NOTE: These actions should only be done by trained technicians with adequate tools to be working with 0402 sized parts.**

To connect SATA Port 0 from the PCIe/104 bus in a STACK UP configuration to mSATA0 please perform the following steps:

- REMOVE (R11& R12) (R15& R16)
- ADD (R9, R10) (R13, R14) (R7, R8) (R4, R8)

To connect SATA Port 0 from the PCIe/104 bus in a STACK DOWN configuration to mSATA0 please perform the following steps:

- REMOVE (R11& R12) (R15& R16)
- ADD (R9, R10) (R13, R14) (R3, R5) (R1, R2)

To connect SATA Port 1 from the PCIe/104 bus in a STACK UP configuration to mSATA1 please perform the following steps:

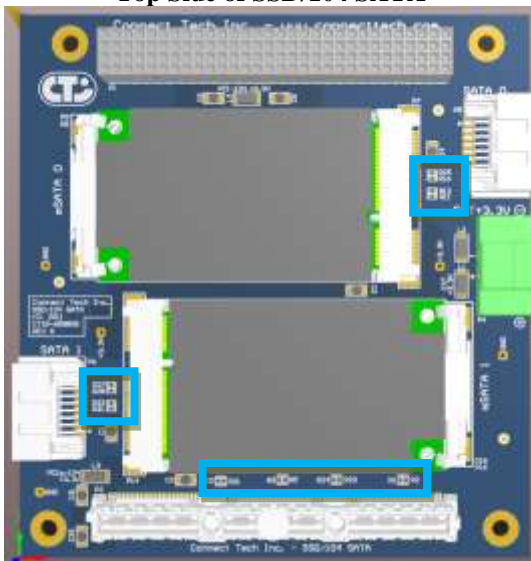
- REMOVE (R27& R28) (R31& R32)
- ADD (R25, R26) (R29, R30) (R17, R18) (R19, R20)

To connect SATA Port 1 from the PCIe/104 bus in a STACK DOWN configuration to mSATA1 please perform the following steps:

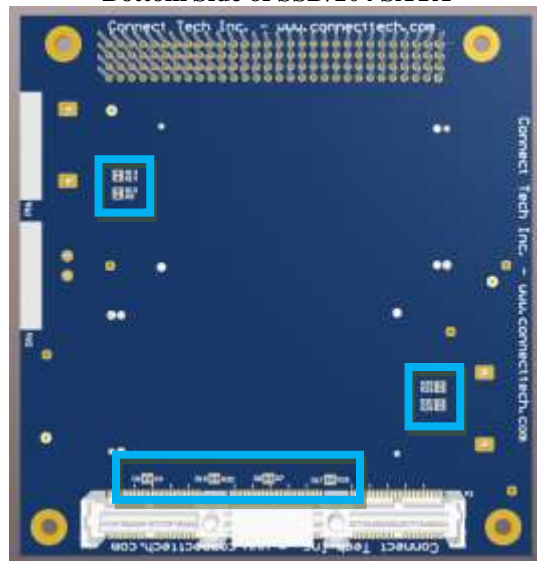
- REMOVE (R27& R28) (R31& R32)
- ADD (R25, R26) (R29, R30) (R21, R22) (R23, R24)

### Locations of 0 ohm Resistor for PCIe/104 SATA Selection

Top Side of SSD/104 SATA



Bottom Side of SSD/104 SATA



## mSATA Slot Connector Pinout

Pin Number	Description
1	NC
2	+3.3V
3	NC
4	GND
5	NC
6	NC
7	NC
8	NC
9	GND
10	NC
11	NC
12	NC
13	NC
14	NC
15	GND
16	NC
17	NC
18	GND
19	NC
20	NC
21	GND
22	NC
23	B+ (SATA TX+ To Host System)
24	+3.3V
25	B- (SATA TX- To Host System)
26	GND
27	GND
28	NC
29	GND
30	NC
31	A- (SATA RX- From Host System)
32	NC
33	A+ (SATA RX+ From Host System)
34	GND
35	GND
36	NC
37	GND
38	NC
39	+3.3V
40	GND
41	+3.3V
42	NC
43	GND
44	NC
45	NC
46	NC
47	NC
48	NC
49	NC
50	GND
51	NC
52	+3.3V